SKILL OBSOLESCENCE AND LIFELONG LEARNING IN THE AGEING WORKFORCE: THE EFFECT ON JOB SATISFACTION

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INTRODUCTION

Population ageing in Italy

Over the past 50 years, Italy has experienced rapid population ageing:

- The share of older individuals (aged 65+) from **9.3%** in 1960 to **23.1%** in 2022

Policies aimed at extending the working life have contributed to the rapid ageing of the Italian workforce (De Rose et al., 2019)

INTRODUCTION

Decline in productivity and skill obsolescence

Older workers may experience a decline in productivity due to changes in the nature of work:

- Technological evolution (e.g., information technologies)
- Organizational changes
- Shifts in employment sectors

Skill obsolescence: Over time, the skills of these workers may become less relevant in the labour market (Rouzet et al., 2019)

BACKGROUND

Learning and skill challenges

- **Accelerated obsolescence:** The ageing workforce intensifies the issue of skill obsolescence (Rouzet et al., 2019)

- **Age-related learning difficulties** create challenges in an ageing society (Schultheiss et al., 2023)

- Older workers are particularly vulnerable to changes in job content due to less recent human capital, leading to accumulated skill obsolescence (Allen et al., 2007)

BACKGROUND

- **Skill obsolescence**: Older workers are more vulnerable to job content changes due to outdated skills, leading to higher obsolescence (Allen et al., 2007)

- **Lifelong learning**: Continuous learning is a solution to counter skill obsolescence and enhance human capital (Schultheiss et al., 2023; Hasan et al., 2015)

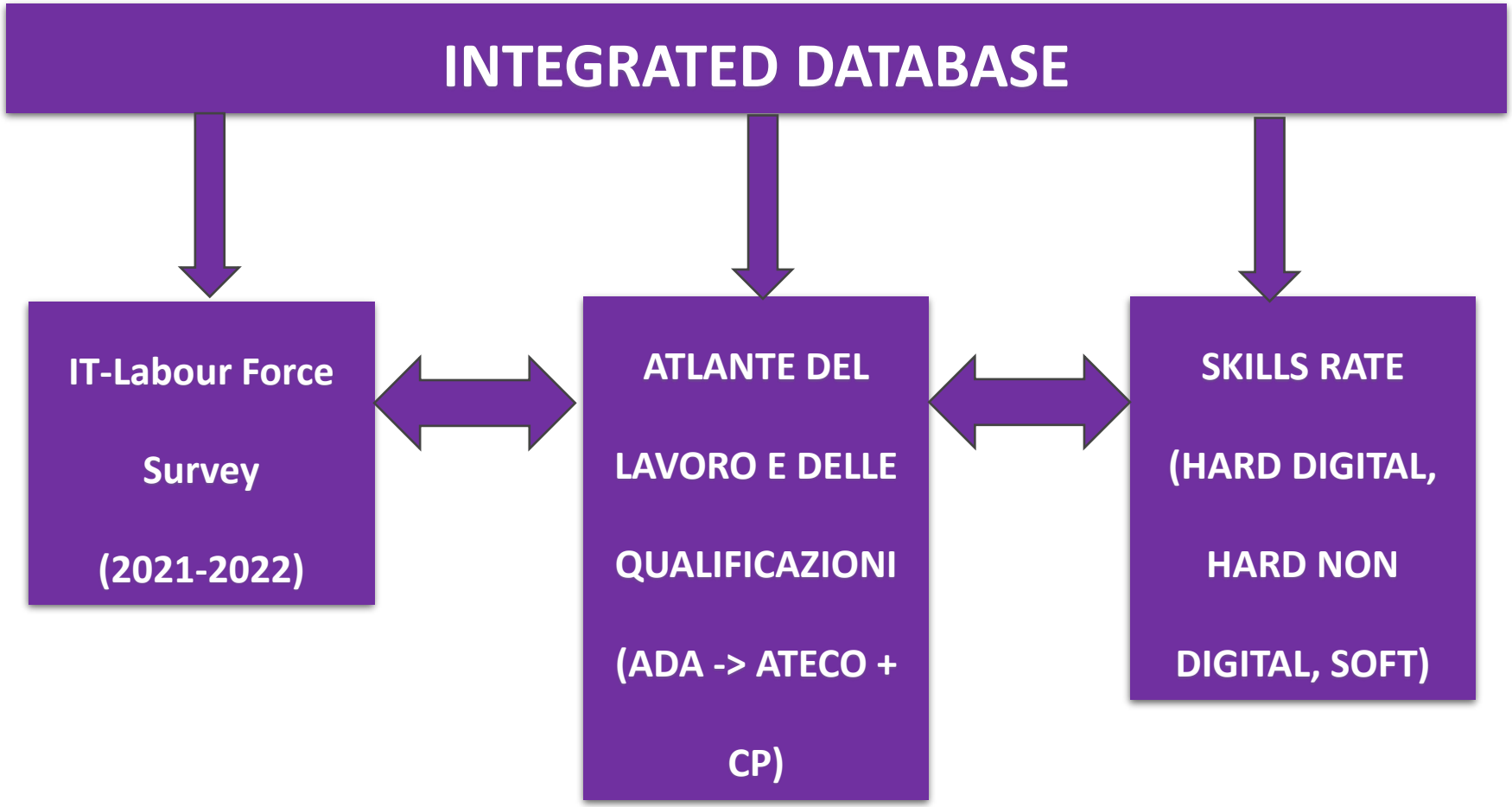
- **Job satisfaction**: Job satisfaction is crucial for worker well-being, especially among older workers. It is linked to performance, turnover, absenteeism, and health (Vieira, 2005; Faragher et al., 2005).

AIM OF THE STUDY

- **Limited specific research**: The relationship between skill obsolescence, lifelong learning, and job satisfaction in older workers has not been thoroughly explored

- **AIM**: To examine the role of lifelong learning in the job satisfaction of Italian workers aged 50+

DATA AND METHODS



DATA AND METHODS

Italian Labour Force Survey (2021-2022):

- **Annual panel** created by reorganising interview units based on the rotation scheme in the sampling plan

- We select only **workers aged 50+**
- The **Armed Forces** and the **Public Administration excluded**

- Longitudinal weight created using a calibration estimator (Deville & Särndal, 1992), applying the following constraints
  - Age classes (14 modes) × gender × geographical distribution (140 constraints)
  - Region × gender × citizenship (126 constraints)
  - Geographical distribution × gender × employment status (30 constraints)

DATA AND METHODS

Atlante del lavoro e delle qualificazioni: Describes work content in terms of tasks and potential products/services delivered through

- The ADA can be identified through a combination of the Ateco and Occupational codes present in the LFS dataset.

DATA AND METHODS

COESIONE ITALIA 21-27 GIOVANI, DONNE E LAVORO

Cofinanziato dall'Unione europea

MINISTERO del LAVORO e delle POLITICHE SOCIALI

08. Vetro, ceramica e materiali da costruzione

Processo: Produzione vetro e lavorazione industriale e artigianale di prodotti in vetro

Sequenza: Progettazione di prodotti e stampi e classificazione prodotti in vetro

- ADA.08.01.01 (ex ADA.6.48.146) - Progettazione di manufatti in vetro
- ADA.08.01.02 (ex ADA.6.48.187) - Gestione delle composizioni chimiche del vetro e classificazione del prodotto finito
- ADA.08.01.03 (ex ADA.6.48.162) - Produzione di stampi

DATA AND METHODS

ADA.08.01.01 (ex ADA.6.48.146) - Progettazione di manufatti in vetro

Codici ISTAT CP2021 associati all'ADA

Codice	Titolo
6.3.2.2.1	Soffiatori e modellatori del vetro

Codici ISTAT ATECO associati alla sequenza di processo

Codice Ateco	Titolo Ateco
23.11.00	Fabbricazione di vetro piano
23.12.00	Lavorazione e trasformazione del vetro piano
23.13.00	Fabbricazione di vetro cavo
23.14.00	Fabbricazione di fibre di vetro
23.19.10	Fabbricazione di vetrerie per laboratori, per uso igienico, per farmacia
23.19.20	Lavorazione di vetro a mano e a soffio artistico
23.19.90	Fabbricazione di altri prodotti in vetro (inclusa la vetreria tecnica)

DATA AND METHODS

Skill rates derived from online job ads

- Based on 8 million validated online job advertisements from the Lightcast database

- Skill rates calculated for each descriptive component of the Atlante del Lavoro:
- **Digital skills**: technical skills related to technologies, IT tools, data analysis
- **Soft skills**: personal and interpersonal skills affecting how one works and interacts
- **Hard non digital skills :** technical skills specific to a sector or profession

These indicators were quantified for 844 ADA (88% of total ADA).

$$skills\ \text{Rate} = \frac{frequency\ of\ skills\ (digital\ or\ hard\ or\ soft)}{frequency\ of\ digital + hard + soft\ skills}$$

DATA AND METHODS

1° analysis: Regression analysis

Sample size **N = 12,773**

- **Dependent variable**: Job satisfaction in 2022 (scale 0 to 10)

- **Independent variables (from 2021):** Gender, education, citizenship, training, hard non-digital skills, occupations, economic sector, geographic area

DATA AND METHODS

2° analysis: Propensity Score Matching

- **PSM** (Arsenijevic and Groot 2018; Pongiglione, 2014) compares the job satisfaction of individuals who received training with non-trained individuals who share similar characteristics.

- **PSM** reduces the selection in in observational studies by matching:
  - **Control group**: individuals who did not receive training;
  - **Treated group**: individuals who receive training.

- We use 10 variables for the matching procedure: Gender, age, citizenship, education, marital status, geographic area, economic sector, occupation, part-time work, indicators for hard digital skills.

- We estimated **the ATT (average treatment effect) -> the average effect of training on individuals**

In other words: how much the training affect satisfaction in 2022 for those who actually received it, by comparing them to similar individuals who did not.

RESULTS

Regression model - Dependent variable: Job Satisfaction (part 1)	Coeff.	S.E.
Training	0.187**	(0.075)
DigitalSkillrate	-0.174	(0.284)
HardnondigitalSkillrate	0.418*	(0.229)
Type of Occupations (ref. Elementary occupations)		
Legislators, Entrepreneurs, and Senior Management	0.816**	(0.373)
Intellectual, Scientific, and Highly Specialized Professions	0.806***	(0.115)
Technical Professions	0.537***	(0.096)
Clerical and Administrative Support Professions	0.278*	(0.163)
Skilled Professions in Commercial Activities and Services	0.357***	(0.089)
Craftsmen, Skilled Workers, and Farmers	0.213**	(0.093)
Plant Operators, Operators of Fixed and Mobile Machinery, and Vehicle Drivers	0.142	(0.115)
Constant	6.844***	(0.284)
Observations	12,773	
R-squared	0.021	

Altri controlli: gender, education, citizenship

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

RESULTS

Regression model - Dependent variable: Job Satisfaction (part 2)	Coeff.	S.E.
Type of economic activity (rif. Other personal and collective services)		
Agriculture, forestry and fishing	-0.175	(0.128)
Manufactory sector	-0.110	(0.113)
Construction	0.039	(0.123)
Distributive trade sector	-0.283***	(0.097)
Accomodation and food services	-0.510***	(0.116)
Transportation and storage services	-0.084	(0.145)
Information and communication services	-0.020	(0.164)
Attività finanziarie e assicurative	-0.234*	(0.136)
Real estate, administrative and support services activities	-0.459***	(0.101)
Education, Health and other social public services	0.017	(0.108)
Geographical area (ref. South)		
North	0.217***	(0.053)
Center	0.101*	(0.061)
Constant	6.844***	(0.284)
Observations	12,773	
R-squared	0.021	
Other controls: gender, education, citizenship		

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

RESULTS

PSM Results - Average Treatment effect on Treated (ATT)						
Variable	**Sample**	**Treated (trained individuals)**	**Controls (non-trained individuals)**	**Difference**	**S.E.**	**t-stat**
Job satisfaction	ATT	7.8299	7.6065	0.2234	0.0823	2.71

Source: Authors' Elaboration on ISTAT and INAPP data

CONCLUSIONS

Skills associated to higher job satisfaction

- Over-50 workers in occupations requiring hard non-digital skills are more satisfied with their jobs than those in roles mainly requiring soft skills.

The effect of formal or non-formal training on job satisfaction

- Workers over 50 who participated in formal or non-formal training in 2021 reported, on average, a higher job satisfaction in 2022 compared to those who do not receive training.
- Formal or non-formal training have a significant and positive effect on job satisfaction

Findings support the hypothesis that participation in formal and non-formal training improves job satisfaction among workers aged 50 and over, after accounting for differences in background characteristics through propensity score matching.

CONCLUSIONS

Further developments:

- Use the **ad hoc module of the 2021 Labour Force Survey** focusing on **skill analysis in occupations**.

- Integrate data with the **INAPP "Indagine Campionaria sulle Professioni"** (*Occupational Survey*) to identify occupations most at risk of skill obsolescence.


Hard skills
Soft skills

THANKS FOR YOUR ATTENTION!

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RESULTS

Employment status transitions among workers 50+

2021	2022			
	Employed	Enemployed	Inactive	Total
Employed	8.037.899	84.740	738.485	8.861.123
Unemployed	119.903	164.867	261.056	545.825
Inactive	287.833	162.913	17.326.332	17.777.078
Total	8.445.634	412.519	18.325.873	27.184.026

Source: Authors' elaboration on ISTAT data

Average value of professional skills indicators by gender

	Man	Woman	Total
Soft Skills	0,34	0,39	0,35
Hard non Digital Skills	0,10	0,09	0,10
Hard Digital Skillls	0,56	0,51	0,54
Totale lavoratori over50	5.045.966	3.815.157	8.861.123

Source: Authors' elaboration on ISTAT and INAPP data

RESULTS

Average value of professional skills indicators

1-digit main occupation code	*Soft skills*	*Hard non digital skills*	*Hard digital skills*
Legislators, Entrepreneurs, and Senior Management	0,35	0,51	0,13
Intellectual, Scientific, and Highly Specialized Professions	0,28	0,45	0,28
Technical Professions	0,30	0,51	0,19
Clerical and Administrative Support Professions	0,30	0,58	0,12
Skilled Professions in Commercial Activities and Services	0,41	0,49	0,10
Craftsmen, Skilled Workers, and Farmers	0,37	0,60	0,03
Plant Operators, Operators of Fixed and Mobile Machinery, and Vehicle Drivers	0,27	0,67	0,07
Elementary Occupations	0,42	0,54	0,05

Source: Authors' Elaboration on ISTAT and INAPP data